

REMARKS

Upon entry of the foregoing amendment, claims 1-29 are pending in the application and presented for reconsideration. The amendments to the abstract and claims do not present any new matter. Support for the amendments may be found throughout the specification generally and in the claims.

Claim 13 has been amended to show proper dependency on claim 12 and to provide a clear antecedent basis for the term "cobalt compound". The claim has also been amended to indicate clearly that the cobalt compounds are cobalt salts of organic acids, acetates, and halides. Support for these changes are found in claims 10-13 as originally filed and on page 15, lines 15-18 of the specification.

In the course of preparing the declaration under 17 CFR §1.131, Applicants discovered several errors to the Examples section of the specification and submit herewith corrections by amendment. These errors were inadvertent and without deceptive intent. Because the amendments address primarily clarification and correction of experimental data originally disclosed in the instant application, Applicants assert that the pending amendments to the Examples section do not present any new matter.

The term "permeability" has been changed in several instances to "transmission" to identify correctly the actual measurements made to the extruded and stretched films described in the examples. Transmission rates can be converted into permeability values and thus represent different but inherently equivalent means for describing the passage of gas through polymer films. Similarly, the units of measurement have been changed to properly reflect transmission values instead of permeability values. These revised units are inherent to the measurement of CO₂ transmission rates using a Mocon permeability analyzer as described in the Examples as originally filed.

The instrument used to measure carbon dioxide transmission rates has been revised to "Mocon Oxtran 1000 permeability analyzer" to "Mocon permeability analyzer" to identify the instrument correctly.

Comparative Example 2 and Example 1, found on paragraphs on pages 24 and 25 of the specification, have been amended to show that the trilayer films are prepared from PET and "modified" MXD6. Support for these changes are found on page 24, lines 14-24 of the specification, from the context of the examples noted above, and in claim

19 as originally filed. The term “nanocomposite” has been replaced with “inner layer” on pages 24, lines 17 and 18 to indicate that the innermost layer of the trilayer film described in the example does not contain layered silicate material and, thus, is not properly described as a nanocomposite. Support for this change can be found within the preceding text of Comparative Example 2.

The text on page 25, line 28, has been amended to “Comparative Example 2” to identify correctly the source of the material used in the example. Accordingly, the term “nanocomposite” has been revised to “composite” to reflect that the material used in the experiment did not contain layered silicate material. The term “blend” has been replaced with “extrudate” on page 26, line 7 and line 24 to describe clearly the film as a product of the extrusion process described in the associated experimental procedure. The temperature and the screw speed of the of the extruder on page 29, lines 11 and 12, have been amended from “260” to “240-245”°C and from “250” rpm to “300” rpm to reflect more accurately the actual experimental conditions. Similarly, the name “Leistritz”, cited on page 29, line 17, has been deleted and replaced with “a Killion single screw” to correctly identify the type of extruder used in the procedure. The screw speed of “250” rpm on page 29, line 18, has been revised to “50” rpm and the phrase “and a feed rate of about 2 kg/hr” has been deleted to again reflect the correct experimental procedure.

Applicants attach hereto a version of the paragraphs from the specification and the claims showing changes made by the current amendment. The attached page is captioned “Version With Markings to Show Changes”.

Missing Abstract

The Office Action states that the application does not contain an abstract of the disclosure as required by 37 CFR §1.72(b). Applicants respectfully submit that the Office Action is in error. Submitted herewith is a copy of the abstract on a separate page as originally filed.

Restriction Requirement

In response to the Examiner's restriction requirement, Applicants hereby affirm the provisional election of Group I with traverse. Applicants submit that the restriction requirement is improper because layered article of Group II is not independent and distinct from the polyamide composition of Group I as required by 35 U.S.C. §121. There is a clear, disclosed relationship between polyamide composition of Group I and the layered article of Group II which comprises the polyamide composition of Group I. The novelty of the layered article of Group II resides in the polyamide composition of Group I. Moreover, the primary application of the polyamide composition of Group I is to produce the article of Group II. In addition, Applicants respectfully submit that search and examination of the entire application on the merits will not present an undue burden on the Examiner. Reconsideration and withdrawal of the restriction requirement is respectfully requested.

Provisional Double Patenting Rejection

Applicants would like to express their appreciation to Primary Examiner Cain for his time in the absence of Examiner Lee in discussing the terminal disclaimer requirements with Michael Blake by telephone on June 13, 2002. As noted during the telephone conversation, Applicants have previously submitted a terminal disclaimer with copending Application No. 09/630518 and wish to delay filing a second terminal disclaimer with the present application. Applicants, therefore, respectfully request that the requirement for a terminal disclaimer be held in abeyance until allowable subject matter is found between the copending applications.

Rejection of Claims 1-18 under 35 U.S.C. §112

The Examiner rejected claims 1-18 under 35 U.S.C. §112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully traverse the rejection and the statements made in support thereof.

Applicants have amended claim 1 to delete the term "derived" as suggested by the Examiner in Section 9, paragraph 1 of the Office Action. Amended Claim 1 now

states clearly that the platelet particles are "from at least one layered silicate material". Applicants respectively point out that the meaning of the term "platelet" as a particle resulting from exfoliation of a layered silicate material is well-known to those skilled in the art. The Examiner is directed to Frisk et al., U.S. Patent No. 5,972,448, col. 5, lines 58-60; col. 9, lines 65-67; and col. 10, lines 1-14, Maxfield et al. U.S. Patent No. 5,385,776, col. 12, lines 27-66, and to Mechanical Engineering Magazine (online edition), April 1, 2001 (<http://www.memagazine.org/backissues/back.html>) attached hereto, for examples of usage of the term "platelet" in accordance with this meaning.

Claim 11 has been amended to include the phrase "Periodic Table of the Elements". Support for this amendment is found on page 15, lines 8-10 of the specification. This change should make clear that the first, second, and third transistion series refers to the Periodic Table of the Elements.

Applicants have amended Claim 14 to reflect proper Markush form. The last clause of the claim which states, "or a metal in a low oxidation state that can be oxidized further to higher oxidation state, usually in combination with a salt" has been deleted in response to the Examiner's objection.

The Examiner has objected to the word "type" as part of the term "Wyoming-type" as indefinite. Applicants respectively submit that term "Wyoming-type" as used in the specification and claims is well-known and clearly understood by those skilled in the art as a variety of montmorillonite and bentonite clays. The Examiner is referred to Stackhouse et al. *J. Amer. Chem. Soc.* **2001**, 123, 11764-11774, which shows "Wyoming-type" to be well known and well understood terminology.

In view of the amendments and foregoing remarks, Applicants believe the Examiner's objections to claims 1-18 under 35 U.S.C. §112, second paragraph, have been overcome and respectfully request reconsideration and withdrawal of the rejection.

Rejection of Claims 1-4, 9-14, and 16 under 35 U.S.C. §103(a)

Claims 1-4, 9-14, and 16 are rejected under 35 U.S.C. §103(a) in view of the disclosure of PCT Application No. WO 99/38914 to Schmidt ("Schmidt") in view of U.S. Patent No. 5,385,776 to Maxfield ("Maxfield"). Applicants respectfully traverse the rejection and the statements made in support thereof.

The present invention is a polymer-platelet particle composition comprising at least one polyamide, at least one oxygen scavenging system, and platelet particles from at least one layered silicate material (Claim 1 as amended).

The primary reference cited by the Examiner, Schmidt, teaches an oxygen scavenging polymer composition suitable for packaging of oxygen-sensitive products in which the oxygen scavenging performance of the polymer is enhanced by heating the polymer. The polyamide MXD-6 is disclosed as a preferred polymer component.

A proper analysis under §103 requires, *inter alia*, consideration of whether the prior art would have suggested to one of ordinary skill in the art both that they should carry out the claimed invention and that there is a reasonable expectation of success in doing so. See In re Vaeck, 20 USPQ2d 1438 (Fed. Cir. 1991). Further, both the suggestion to carry out the claimed invention and a reasonable expectation of success must be found in the prior art. *Id.* As set forth below, neither the requisite suggestion nor the expectation is found in the cited art.

Schmidt does not teach or suggest a polyamide composition which contains an oxygen scavenging system and platelet particles from a layered silicate material nor does Schmidt motivate or provide a reasonable expectation of success for Applicants polymer composition. Instead, Schmidt teaches solid stating as a means of enhancing both the oxygen scavenging performance of the polymer and the melt-viscosity of the polyamide. Schmidt emphasizes a high melt viscosity to enable a thicker layer of polymer for greater oxygen scavenging capacity and teaches a 5 layer package to provide an additional passive barrier to oxygen. Schmidt states that “oxygen scavengers are superior to passive barriers in that they both remove oxygen from inside the package and retard its ingress into the package” (see page 2, lines 4-5). From these teachings, it is clear that Schmidt does not recognize the advantages of a polymer composition utilizing an oxygen-scavenging system in combination with a layered silicate material to enhance both the oxygen scavenging properties of the composition and its passive barrier to gases such as oxygen or CO₂. Without this recognition, Schmidt could not have contemplated or in any manner suggested Applicants’ polymer composition.

The teachings of Maxfield would not remedy the shortcomings of Schmidt. Maxfield discloses a composite formed from a gamma phase polyamide and dispersed particles from layered materials including smectite clay minerals. These compositions are noted to provide improved rigidity and water resistance strength while retaining toughness, surface gloss, and abrasion resistance. From the orientation of the platelet particles as measured by X-ray defraction, enhanced barrier properties also result. Maxfield adds little to the teachings of Schmidt and provides no actual performance data on the barrier properties of polyamide nanocomposites toward oxygen or carbon dioxide. Rather, Maxfield emphasizes improvements in the structural properties of nanocomposites. Without such data or discussion of barrier properties, Maxfield would not have taught or suggested a polyamide composition in which an oxygen scavenging system is combined with a layered silicate material to improve barrier properties and to enhance oxygen scavenging performance. Moreover, Maxfield requires the polyamide contain at least 1 wt% gamma phase which is not required in Applicants' composition. Based on Maxfield, it would have been entirely reasonable for one skilled in the art to conclude at the time of the invention that the presence of at least 1 wt % gamma phase in the polyamide is necessary to obtain the properties disclosed in Maxfield. The combination of Schmidt and Maxfield, therefore, teaches distinctly away from Applicants' composition.

Applicants respectively submit that the Examiner fails to provide a clear and particular showing of a teaching, suggestion, or motivation to combine the cited references to obtain the present invention. The Examiner states "Both prior art disclosures require clear containers with excellent gas barrier property... Since both disclosures have the same goal, which is a transparent container with excellent gas barrier property, the combination of two known compositions is expected to work in [an] additive or cumulative manner". Applicants respectively submit that the Examiner has misinterpreted the cited art in at least 3 ways: First, Maxfield emphasizes "improved rigidity and water resistance strength" (col. 1, lines 55-62) and is silent regarding transparent packaging or containers; there is no mention of a need for clarity with regards to packaging compositions. It is evident, therefore, that the disclosure of Maxfield is not directed toward beverage bottles where transparency is a necessary

requirement. By contrast, Schmidt discusses at length the need for clarity in plastic bottles for beer and the food industry. A transparent container, therefore, could not have been a common goal between the disclosures as stated by the Examiner.

Secondly, the Examiner fails to distinguish between important differences in the gas barrier art and further misinterprets the goals of the cited references. The disclosure of Schmidt is directed to removal of oxygen inside the container and retarding the passage of oxygen through the bottle through from the exterior. The disclosure of Schmidt is concerned only with oxygen scavenging and is silent around any need to provide additional barriers for oxygen or other gases such as CO₂. Schmidt provides no suggestion, implicit or otherwise, that a such a barrier can be incorporated into the active scavenging layer nor indicates that such a barrier would have been desirable. Similarly, Maxfield only speculates that nanocomposite films may exhibit decreased permeability to gases such as oxygen. Maxfield does not provide any gas permeability data and there is no hint or suggestion of the desirability or need to incorporate the gas scavenging system of Schmidt to further reduce oxygen permeability. Without any discussion or suggestion of common needs, there can be no common goals between the teachings of Schmidt and Maxfield nor any motivation to combine their teachings.

Finally, the Examiner's conclusion that the combination of known compositions of Schmidt and Maxfield is expected to work in an additive or cumulative manner is untenable. Maxfield provides no permeability data and only speculates on the gas barrier properties of the disclosed polyamide nanocomposite. Hence, no conclusion can be made on actual barrier effect on oxygen or other gases in a polyamide composition. Also, the Examiner has overlooked the complex chemistry associated with the oxygen-scavenging system disclosed by Schmidt which can be dramatically affected by a multitude of factors including the nature of the catalyst, the catalyst counter ion, thickness of the polymer layer, dispersion of the catalyst, and crystallinity of the polymer. Given the lack of data in Maxfield, the cited art simply would not have provided to a person of ordinary skill in the art a reasonable basis to conclude an additive or cumulative effect.

Applicants respectively submit that the stated rejection fails to establish a *prima facie* case of obviousness. The cited art would not have suggested or motivated the

skilled artisan to combine references that teach the invention alleged to be obvious. There must be a “rational connection between the facts found and the choice made.” See In re Lee 61 U.S.P.Q. 2d 1430 (Fed. Cir. 2002). Here there is no such rational connection between the teachings of Schmidt and Maxfield and the presently claimed invention. Schmidt teaches only a polyamide oxygen-scavenging composition; there is no hint or suggestion to combine the additional barrier properties of the nanocomposites disclosed by Maxfield. Likewise, the disclosure of Maxfield hypothesizes on the barrier properties associated with the incorporation of layered clays into polyamides; there is no suggestion to add the oxygen scavenging system disclosed by Schmidt to achieve additional gas barrier properties. In addition, because the cited art does not provide the requisite suggestion to make the present invention, the cited art necessarily lacks any expectation that the invention would succeed.

Even if one assumes a valid *prima facie* case, secondary considerations point away from obviousness. As noted in the current application, Applicants’ composition shows an unexpectedly large increase in the total amount of oxygen consumed over the identical polyamide composition without the platelet particles. Because the platelet particles would be expected to act only as a passive physical barrier to oxygen permeation, they should affect only the rate of oxygen permeation and have no effect on the total amount of oxygen consumed by the oxygen scavenging system. Instead, as shown in Comparative Example 2 and Example 1 of the present application, oxygen consumption for the polyamide composition of the instant invention increased by 84% over the identical polyamide composition without the platelet particles. This result is completely unexpected and would have been unobvious to one skilled in the art at the time of the invention.

In summary, the cited references, considered alone or in any reasonable combination would not have suggested or motivated the claimed invention. As set forth above, the disclosures of Schmidt and Maxfield are directed toward different goals and there would have been no suggestion or motivation provided in either reference at the time of the invention to combine the their respective teachings to arrive at Applicants’ claimed invention. In addition, Applicants’ have shown that the cited art provides no information which would have allowed a prediction of a the performance of Applicants’

composition. Thus, the cited art would not have provided an implicit suggestion to combine the teachings of Schmidt and Maxfield nor would have any reasonable expectation of success. Finally, Applicants have also shown unexpected results from the present invention. In view of the foregoing, Applicants respectfully submit that the rejection is in error and should be withdrawn.

Rejection of Claims 14, 15, 17, and 18 under 35 U.S.C. §103(a)

Claims 14, 15, 17, 18 are rejected under 35 U.S.C. §103(a) as allegedly obvious in view of PCT Application No. WO 99/38914 to Schmidt ("Schmidt") in view of U.S. Patent No. 5,385,776 to Maxfield ("Maxfield") and further in view of U.S. Patent No. 6,254,803 to Matthews ("Matthews"). Applicants respectfully traverse the rejection.

The shortcomings of the Schmidt and Maxfield references as applied to claims 1-4, 9-14, and 16 are set forth above and incorporated herein by reference. Matthews would not have overcome these deficiencies. Matthews is directed toward a oxygen scavenging composition containing a cyclohexene group or functionality that can be used in the presence of a transition metal salt and, optionally, a photoinitiator. The presence of the cyclohexenyl moiety within this composition results in fewer by-products from the oxygen scavenging function. Applicants respectfully submit that Matthews adds little, if anything, to the combined teachings of the other references. As in the other cited references, Matthews would have failed to teach or suggest Applicants' polyamide composition containing an oxygen-scavenging system and platelet particles from a layered silicate material. Matthews also would have failed to motivate a person of ordinary skill in the art to combine the cited references to arrive at the present invention. Rather, Matthews teaches away from the present invention by teaching the use of the oxygen scavenging composition in combination with a separate barrier layer (see col. 13, line 44 through col. 14). The disclosure of Matthews makes no mention of an oxygen scavenging system in combination with a barrier material within the same layer as is disclosed in the present invention. Matthews further teaches away from the combination of a silicate platelet particle and a oxygen scavenging composition by the stating, "It is also well know[n] in the art that such additives (zeolites and silicas) adversely affect the haze and clarity of packaging structures" (see col. 10, lines 6-8).

Applicants argue that the Matthews disclosure, with or without the benefit of the other cited references, clearly would not have suggested or taught Applicants' polyamide composition containing an oxygen scavenging composition and platelet particles from a layered silicate material.

It is the Applicants' respectful submission that the combination of the Schmidt, Maxfield, and Matthews references, outside of the teachings of Applicants' disclosure, would not have motivated the claimed invention nor have provided a reasonable expectation of success. Applicants respectfully submit that the rejection is in error and should be withdrawn.

Rejection of Claims 5-8 under 35 U.S.C. §103(a)

Claims 5-8 are rejected under 35 U.S.C. §103(a) as allegedly obvious in view of PCT Application No. WO 99/38914 to Schmidt ("Schmidt") in view of U.S. Patent No. 5,385,776 to Maxfield ("Maxfield") and further in view of U.S. Patent No. 5,248,720 to Deguchi ("Deguchi"). Applicants respectfully traverse the rejection.

Again, the shortcomings of the Schmidt and Maxfield references as applied to claims 1-4, 9-14, and 16 are set forth above and incorporated herein by reference. The addition of Deguchi would not have remedied these shortcomings. Deguchi teaches a process for preparing a polyamide nanocomposite by first contacting a swelled, dispersed, layered silicate material with a organic cation of a lactam and then polymerizing the lactam. Deguchi also teaches an useful amount of silicate in the range of 0.5-15 wt %. Deguchi, either alone or in combination with Schmidt and Maxfield, would have failed to suggest or provide any motivation to combine the teachings of the cited references to obtain the claimed invention. The goals of Deguchi are clearly not directed at packaging applications where oxygen and CO₂ permeation are critically important. Although Deguchi teaches an improvement in the oxygen barrier properties of a polyamide composition by the presence of a layered silicate, the use of these compositions is not directed toward areas such as food packaging where oxygen permeation is of critical importance. Instead, emphasis is placed on applications in molded articles such as gasoline tanks, alcohol tanks, and brake oil tanks which require the high rigidity and impact strength imparted by the layered silicate. Deguchi, therefore,

would not have offered any explicit or implicit suggestion or motivation to combine the teachings of the cited references to obtain a polyamide composition containing an oxygen scavenging system and platelet particles from a layered silicate as recited in the claims of the present invention.

Applicants respectfully submit that the teachings of Deguchi, alone or in combination with the disclosures of Schmidt and Maxfield would not have suggested or motivated the combination of the cited references to obtain the polyamide composition set forth in the claims. Applicants, therefore, respectfully request reconsideration and withdrawal of the rejection.

Declaration Under 37 C.F.R. §1.131

Applicants submit herewith a declaration under 37 C.F.R. §1.131 which shows conception and reduction of practice of the present invention as claimed prior to August 5, 1999. Because Applicants' invention is prior to the reference date of the primary cited reference, Schmidt, Applicants respectfully request that the reference be withdrawn. Applicants submit that in the absence of the teachings of Schmidt, the remaining references, Maxfield and Deguchi, disclose only polyamide composites containing layered materials and would not have suggested, taught, or contemplated Applicants' polyamide composition containing an oxygen-scavenging system in combination with a layered silicate material.

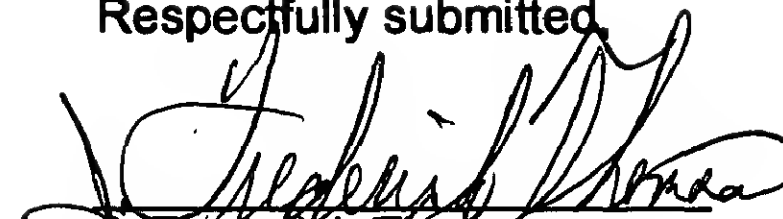
In summary, Applicants believe that each of the Examiner's objections given in the Office Action have been addressed and that pending claims 1-29 are patentable. Applicants respectfully submit that the §§112 and 103 rejections are not supported by the cited references. In addition, Applicants have antedated Schmidt as a reference by showing reduction to practice of the claimed invention prior to the critical reference date of Schmidt. Accordingly, withdrawal of the rejections of claims 1-29 and early allowance of the application are earnestly solicited.

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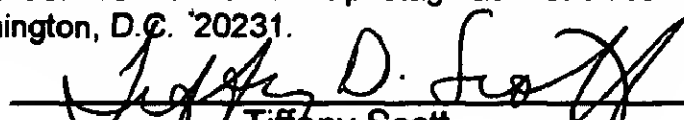
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14 JUNE
Date

CERTIFICATE OF MAILING UNDER 37 CFR 1.8(a)

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.


Tiffany Scott

6/14/02
Date

VERSION WITH MARKINGS TO SHOW CHANGES MADE**In the Specification**

Changes made to the paragraph at page 23, lines 15 through 16:

Carbon dioxide [permeability] transmission rates [was] were measured on film samples using a Mocon [Oxtran 1000] permeability analyzer.

Changes made to the paragraph at page 23, lines 19 through 25:

Two trilayer films were extruded comprising internal layers of about 10 and 30 vol% of unmodified MXD6 6007, available from Mitsubishi Gas Company, with two external layers of PET-9921, available from Eastman Chemical Company. Several 2-inch square sections of the trilayer films were stretched using a T. M. Long instrument (4x4 orientation at about 110°C). The carbon dioxide [permeability] transmission values of the oriented films were determined to be 174 and 59 [cc•mil/100in²•day•atm,] cc(STP) CO₂/meter²/24hr for the 10 and 30 vol% films respectively.

Changes made to the paragraph at page 24, lines 10 through 20:

Two trilayer films were extruded comprising internal layers of about 10 and 30 vol% of the above modified MXD6 6007, available from Mitsubishi Gas Company, with two external layers of PET-9921, available from Eastman Chemical Company. Several 2-inch square sections of the trilayer films were stretched using a T. M. Long instrument (4x4 orientation at about 110°C). The carbon dioxide [permeability] transmission values of the oriented films were determined to be 168 and 54 [cc•mil/100in²•day•atm] cc(STP)CO₂/meter²/24hr, for the 10 and 30 vol% films respectively. Oxygen consumption for 3.0 grams of the inner [nanocomposite] layer, after removing the PET 9921 layers from the unoriented film comprising 30 vol% [nanocomposite] inner layer, was determined to be about 370 microliters of oxygen over a period of 136 hours, as shown in Figure 1.

Changes made to the paragraph at page 25, lines 12 through 22:

Two trilayer films were extruded comprising internal layers of about 10 and 30 vol% of the above modified MXD6 6007, available from Mitsubishi Gas Company, with two external layers of PET-9921, available from Eastman Chemical Company. Several 2-inch square sections of the trilayer films were stretched using a T. M. Long instrument (4x4 orientation at about 110°C). The carbon dioxide [permeability] transmission values of the oriented films were determined to be 117 and 41 [cc•mil/100in²•day•atm] cc(STP)CO₂/meter²/24hr, for the 10 and 30 vol% films respectively. Oxygen consumption for 3.0 grams of the inner nanocomposite layer, after removing the PET 9921 layers from the unoriented film comprising 30 vol% nanocomposite, was determined to be about 680 microliters of oxygen over a period of 136 hours, as shown in Figure 1.

Changes made to the paragraph at page 25, line 27 through page 26, line 9:

Using a Leistritz Micro-18 twin screw extruder, 4 parts of the material prepared in Comparative Example [1] 2 was extrusion compounded with 96 parts of PET-20261, available from Eastman Chemical Company, at a temperature of about 275°C with screw speed of about 300 rpm and feed rate of about 2 kg/hr, and the composite was stored under nitrogen. A trilayer film was extruded comprising internal layers of about 50 vol% of this material with two external layers of PET-9921, available from Eastman Chemical Company. Several 2-inch square sections of the trilayer film was stretched using a T. M. Long instrument (4x4 orientation at about 110°C). The carbon dioxide [permeability] transmission value of the oriented film was determined to be 411 [cc-mil/100 in²-24hr.-atm] cc(STP)CO₂/meter²/24hr, for the 50 vol% film. Oxygen consumption for 10 grams of the unoriented film comprising 50 vol% of the [blend] extrudate of PET 9921 with the [nanocomposite] composite was determined to be about 60 microliters of oxygen over a period of 136 hours, as shown in Figure 2.

Changes made to the paragraph at page 26, lines 17 through 26:

Two trilayer films were extruded comprising internal layers of about 30 and 50 vol% of this material with two external layers of PET-9921, available from Eastman Chemical Company. Several 2-inch square sections of the trilayer films were stretched using a T. M. Long instrument (4x4 orientation at about 110°C). The carbon dioxide [permeability] transmission values of the oriented films were determined on a Mocon [Oxtran 1000] permeability tester to be 317 and 291 [cc•mil/100in²•day•atm] cc(STP)CO₂/meter²/24hr, for the 30 and 50 vol% films respectively. Oxygen consumption for 10 grams of the unoriented film comprising 50 vol% of the [blend] extrudate of PET 9921 with the nanocomposite was determined to be about 60 microliters of oxygen over a period of 136 hours, as shown in Figure 2.

Changes made to the paragraph at page 29, lines 6 through 20:

547 parts of a low molecular weight poly(m-xylylene adipamide) with IV of about 0.44 dL/g, 129 parts of organo montmorillonite clay containing a tether, octadecyl methyl bis(hydroxyethyl) ammonium chloride, an organoclay available from Southern Clay Products, and 39.8 parts of cobalt(II) acetate tetrahydrate were dry mixed then dried at 80°C overnight in a vacuum oven. The mixture was then extruded on the Leistritz Micro 18 corotating twin screw extruder equipped with a general compounding screw at a temperature of about [260] 240-245°C, with screw speed of about [250] 300 rpm, and a feed rate of about 2 kg/hr. The material was air-cooled on a casting belt then pelletized upon exiting the extruder. After the extrusion was complete, about 40 parts of the pellets were dry-mixed with about 960 parts of CB11, a polyester available from Eastman Chemical Company. The mixture was then extruded on [the Leistritz] a Killion single screw extruder at a temperature of about 280°C, with screw speed of about [250] 50 rpm[, and a feed rate of about 2 kg/hr]. The material was extruded into 5-mil thick film. This film exhibited good carbon dioxide barrier and oxygen consumption.

In the Claims

1. (Amended) A polymer-platelet particle composite comprising at least one polyamide, at least one oxygen scavenging system, and platelet particles [derived] from at least one layered silicate material.
11. (Amended) The composition of claim 10 wherein said oxygen scavenging catalyst is selected from the group consisting of the first, second, and third transition series of the Periodic Table of Elements.
13. (Amended) The composition of claim [11] 12 wherein said cobalt compound is selected from the group consisting of cobalt salts of organic acids, cobalt acetates, cobalt halides, and mixtures thereof.
14. (Amended) The composition of claim 1 wherein said oxygen scavenging system is selected from the group consisting of ethylenically unsaturated hydrocarbons and a transition metal catalyst; ascorbate; isoascorbate; sulfite; ascorbate with an oxygen scavenging catalyst; transition metal complex [or chelate] of a polycarboxylic acid; transition metal complex [or chelate] of polyamine; transition metal complex [or chelate] of salicylic acid; a reduced form of a photoreducible dye compound; carbonyl compound with an absorbance in the ultraviolet spectrum; tannin; polyethers with a transition metal catalyst; polyamides with a transition metal catalyst; organic compounds having a tertiary hydrogen, benzylic hydrogen or allylic hydrogen in combination with a transition metal catalyst; and an oxidizable metal in combination with a salt[; or a metal in a low oxidation state that can be oxidized further to higher oxidation state, usually in combination with a salt].

In the Abstract

Changes made in the abstract on page 34:

ABSTRACT OF THE DISCLOSURE

[The present invention relates to polymer-platelet particle composites comprising at least one polyamide resin, at least one oxygen scavenging system, and platelet particles derived from at least one layered silicate material.]

Disclosed are polymer composite materials comprising at least one polymer resin and platelet particles from at least one layered silicate material uniformly dispersed in the resin and articles prepared from the polymer composite materials. The polymer composite contains at least one polyamide resin, at least one oxygen-scavenging catalyst, and at least one layered silicate material. These polymer composite materials are especially useful for manufacturing clear polyester bottles and polyester film that are recyclable, have improved active gas barrier properties to oxygen, and have improved passive barrier properties to carbon dioxide and other gases. The polymer composite materials can be used in relatively minor amounts as either a blend or a coextruded thin layer with virgin or post consumer recycled polyesters and related copolymers.